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A new species of *Mycosphaerella* associated with foliage and stem necrosis on *Phytolacca americanae*

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Abstract—The new species *Mycosphaerella americanae* (*Ascomycota, Mycosphaerellaceae*) associated with stem and foliage necrosis on *Phytolacca americanae* is newly described from Brazil. The spermatial state (*Asteromella*) as well as the conidial state (*Septoria*) were also collected and described.

Key words — *Ascomycetes*, coelomycetes, pleomorphic fungi, tropical fungi, weeds

Introduction

Phytolacca americanae L. (*Phytolaccaceae*) has several common names in the USA – American pokeweed, inkberry, pigeonberry, pokeweed – in Brazil it is known as fruto-de-pombo or caruru-açú. It is a widely distributed American perennial herb or small shrub. In Brazil it commonly occurs in recently deforested areas, in areas that were subjected to fires or otherwise disturbed (Lorenzi 2008). Although it is listed in the main Brazilian weed lists (Lorenzi 2008, Kissmann 2000) it is regarded as a weed of minor importance in Brazil and sometimes it is used as an ornamental for its attractive foliage and violet inflorescences. In American literature it is commonly regarded as a weed, a poisonous plant, a medicinal plant, and also (with special processing of some parts) a food. Since February 1998, a disease has been observed resulting in extensive necrosis of *P. americanae* in the highlands of the state of Rio de Janeiro (Brazil). Most observations were made in the municipality of Nova Friburgo and neighboring areas. Closer observations revealed the presence of minute

black fruiting bodies associated with necrotic tissues. This publication provides an account of the fungus associated with this disease.

Material and methods

Selected diseased parts of *P. americanae* were collected and dried in a plant press for later examinations and deposit in the local herbarium – Herbário da Universidade Federal de Viçosa (Herbarium VIC). Sections of leaf fragments bearing fungal structures were prepared with a microtome cryostat HM 520 Microm and slides were mounted in lacto-fuchsin or lactophenol. Observations, measurements, and illustrations were made using a light microscope Olympus BX 51 fitted with a drawing tube and a digital camera Olympus BX E330.

Taxonomic description

Mycosphaerella americanae B.V. Lima, R.W. Barreto & D.J. Soares, **sp. nov.**
Mycobank mb 512636 (figs 1-7)

Macullae amphigenae, albidae, cum margine nigrae incrassatae elevatae. Spermogonie pycnidial, globosa, 26–60 × 28–77 µm. Spermatia globosa vel oblonga, 2.5–6.5 × 1.3– 2.5 µm. Ascomata singularia, 41–109 × 45–125 µm, asci 35–49 × 9–13 µm. Ascosporae 10–15 × 2.5–4 µm. Conidiomata pycnidial. Cellulae conidiogenae ampulliformis vel subcylindricae, 6–25 × 3–6 µm hyalinae. Conidia cylindrica, pluriseptata, 20–42 × 2–3 µm, hyalina.

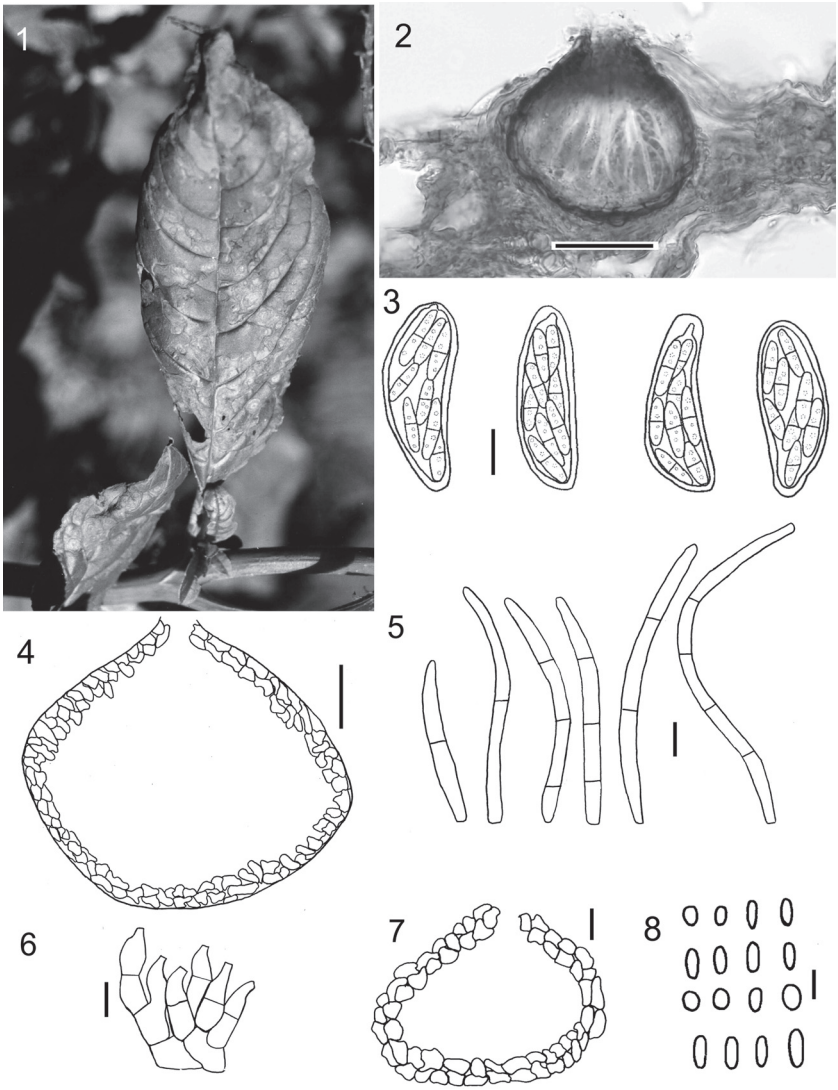
Type: Brazil. Rio de Janeiro: Nova Friburgo - on *Phytolacca americanae*, April 2008, R.W. Barreto 876 (**Holotype** VIC 30712).

Spermatial state: *Asteromella* sp.

Anamorph: *Septoria* sp.

Etymology: based on the specific epithet of the host.

Lesions on living leaves and stems; on leaves lesions starting as necrotic dots becoming circular to elliptical, 1.8–12 × 1.5–14 mm, gray with concentric zonation and brown margins; on stems lesions are necrotic, elliptic and sunken. Spermogonia pycnidial, globose, 26–60 × 28–77 µm, walls 4–11.5 µm thick composed of pale brown textura angularis; spermatiospores globose to oblong, apices rounded, 2.5–6.5 × 1.3– 2.5 µm, hyaline. Pseudothecia hypophyllous, globose, semi-immerse, isolate, 41–109 × 45–125 µm, walls composed of textura angularis pale to dark brown, 2–3 cells, 4–19 µm thick; dehiscence ostiolate, central, circular, 6.5–32 µm diam.; asci bitunicate, fasciculate, subcylindrical, ellipsoidal to slightly obclavate, 34.5–50 × 9–13 µm; ascospores fusiform with rounded apices inordinate to biseriate, 10–15 × 2.5–4 µm, one-septate, hyaline, guttulate. Conidiomata (scarce in the available specimens) pycnidial, globose, pale brown; conidiogenous cells holoblastic, ampulliform, lageniform to subcylindrical, 6–25 × 3–6 µm, septate, hyaline; conidia filiform, straight to sigmoid, 20–41.5 × 2–3 µm, 1–5 septate, hyaline.



Figs. 1–8. *Mycosphaerella americanae* on *Phytolacca americana*. 1. Leaf spot symptoms; 2. Transversal section of infected leaf showing a pseudothecium; 3. Asci and ascospores; 4. Pycnidium of the *Septoria* anamorph of *M. americanae*; 5. Conidia of *Septoria* sp.; 6. Conidiogenous cells of *Septoria* sp.; 7. Spermatial stage of *M. americanae*; 8. Spermatiospores.
Scale bars: 2 = 50 µm; 3 and 7 = 10 µm; 4 = 20 µm; 5, 6 and 8 = 5 µm.

Addition specimen examined (Paratype): Brazil. Rio de Janeiro: Nova Friburgo - on *Phytolacca americanae*, February 1998, R.W. Barreto 44 (VIC 30711).

Comments —*Mycosphaerella* is a very large genus containing around 647 species (Kirk et al 2008) associated with numerous host genera. Previously, the only species in the genus known to associate with the *Phytolaccaceae* has been *Mycosphaerella circe* (Sacc.) Tomilin, which was described on *P. decandra* L. in Italy (Saccardo 1882: 512). *Mycosphaerella americanae* is easily separated from *M. circe* by having narrower ascospores (5-6 µm diam.) as well as associating with a different host species. As for the conidial state of the fungus, a more complicate situation exists.

There are four different species of *Septoria* described in association with the *Phytolaccaceae*, namely: *S. pamparum* Speg. on *Pircunia dioica* (L.) Moq. in Argentina; *S. phytolaccae* Cavara on *P. decandra* in Italy; *S. patouillardii* Sacc. & P. Syd. on *Phytolacca* sp. in Equador and *S. rivinae* Pat. on *Rivina octandra* L. in Central America (Farr et al. 2008, Mendes et al. 1998, Viégas 1961). Another species of *Septoria* that was described on a *Phytolacca* species is *Septoria phlyctaenoides* Berk. & M.A. Curtis. However, *S. phlyctaenoides* was later transferred to *Phlyctema* (Saccardo 1884: 594, as "*Phlycaena septorioides*").

Both *S. phytolaccae* and *M. circe* have been reported from the same host (*P. decandra*) in northern Italy and this may represent an unreported anamorph-teleomorph connection. *Septoria phytolaccae* is similar to the anamorph of *M. americanae* but its conidia are longer and narrower (45–55 × 2 µm) (Saccardo 1895: 545). *Septoria pamparum* has shorter and narrower conidia (12–15 × 1–1.5 µm) and was reported on *P. dioica* (Saccardo 1884: 554). *Septoria rivinae* has longer conidia (45–60 µm) and was reported on a different genus (Saccardo & Trotter 1913: 1112-1113). *Septoria patouillardii* is rather close to the anamorph of *M. americanae* but it has shorter conidia (20–23 µm) and its conidia have only 1-3 septa (Saccardo & Sydow 1899: 969). Data on both anamorphic and teleomorphic states of the *Mycosphaerella* newly described are therefore sufficiently different from related taxa to justify the proposal of a new species.

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